# COUNTER / TIMER

## INSTRUCTION MANUAL

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## SD 1924 ✣ SD 1925 ✣ SD 1926

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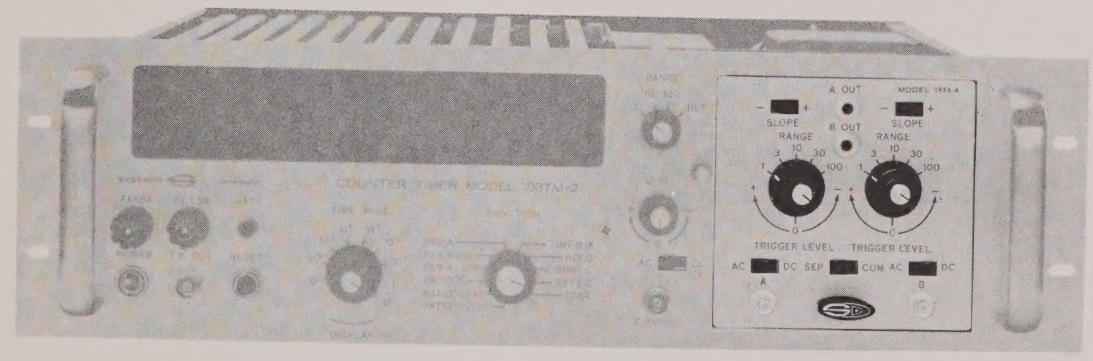
# AMPLIFIER PLUG-INS

MODELS
1925, 1926, 1926A, 1926A-1

1 manual
TO Cal Lab.

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INSTRUCTION MANUAL

# Amplifier Plug-ins for Digital Counters

**Models 1924 (Dual Measurement), 1925 (Single Channel), 1926A (Dual Channel), 1926 (Three-Channel)**

# 1 — General Description

## 1.1 INTRODUCTION

Systron-Donner counters are designed with interchangeable input amplifier plug-ins to provide all the functions or only those functions which the customer wishes to buy. The number of input amplifier channels needed to perform the basic measuring functions of a digital counter are listed below:

| Mode of Measurement | No. of Amplifier Channels needed |
|---|---|
| Frequency (Rate), Period, Count | 1 |
| Time Interval, Ratio | 2 |
| Gate | 3 |

Correspondingly, three basic amplifier plug-ins are offered: the single-channel Model 1925, the dual channel Model 1926A, and the three-channel Model 1926. A fourth amplifier plug-in, the Model 1924 Dual Measurement unit, provides the same functions as the dual channel 1926A and, in addition, has an automatic switching feature which allows two inputs to be measured alternately, in the rate or period modes.

*1.2 Choosing the Plug-in Unit.* With counters having no built-in amplifier channels (Models 1013, 1033, 1034), the choice of plug-in can be made directly from the table above. With Models 1014 and 1037 having a built-in amplifier, this channel may take the place of an additional plug-in channel. It should be pointed out that the built-in channel does not have slope selection, which imposes certain limitations on time interval and pulse width measurements, as explained in the basic counter manual. Therefore, it is usually preferable to add the dual channel Model 1926A rather than the single channel 1925 for these measurements.

*1.3 Features.* Each plug-in unit contains one or two virtually identical input channels, designated A and B, which feature AC or DC coupling, five-step 1:100 attenuators, variable trigger level controls for precise selection of timing intervals and optimum count reliability, and slope selection for triggering with either positive or negative-going waveforms. An oscilloscope marker output is available for trigger level adjustments on Models 1925, 1926A, and 1926.

The A channel has a dual output designated A and A' the slope of which can be selected individually by the corresponding A and B (or start and stop) slope switches. This feature permits pulse width measurements in the Period function. The B channel has a single output but otherwise is identical.

The third or gate channel of the Model 1926 is a fixed-type input pulse-former channel without input adjustments.

The Model 1924 has a selector switch which selects either the A or B inputs for Rate, or Period measurements, or A and B alternately.

# 2 — Specifications

**(Models 1924, 1925, 1926, 1926A)**

*2.1 A and B Channels:*

| | |
|---|---|
| Input: | Arbitrary waveshape, 0 to 10 megacycles per second; 500 volts peak-to-peak maximum. |
| Impedance: | 1 megohm shunted by 50 uuf in "1, 3" attenuation position -- 10 megohm shunted by 50 pf in 10, 30 and 100 attenuation positions. |
| Sensitivity: | 0.1 volt rms from 0-10 Mcs. |
| Trigger Level: | Continuously adjustable from –3 to +3 volts refered to the attenuated input. |
| Attenuation Ratios: | 1, 3, 10, 30, 100. |
| AC Input: | 0.1uf in series with DC input. |
| Output: | A positive pulse to the count gate or start-stop control circuitry of the counter. Each pulse is triggered when the attenuated input signal intersects the selected trigger level on either the positive or negative slope. |
| Marker Output: | Rectangular waveform corresponding to the frequency of input signal. The positive and negative slopes of the rectangular waveform occur at the selected trigger level intercept of the input waveform. |

*2.2 Gate Input: (Model 1926 only)* Arbitrary waveshape, 1 volt, rms, to 50V rms maximum. 10K input resistance, 100cps to 2.5Mcs.

*2.3 Functions With Counter (with no additional amplifier built-in).*

Model 1925 single channel: Rate, Period, Count
Model 1926A: Same as 1925 plus Time Interval, Ratio
Model 1926: Same as 1926A plus "Gate"
Model 1924: Same as 1925 for either A or B inputs, or A and B alternately. Same as 1926A when in the "A" position.

# 3 — Installation

*3.1 With the Models 1013, 1033, and 1034 counters.* The amplifier plug-in unit is installed directly into the plug-in receptacle slot.. A thumb screw secures the plug-in panel.l There are no electrical alterations to be made.

*3.2 With Model 1037:* When furnished without plug-in units, these models have jumper plugs installed in the plug-in amplifier receptacle which must be removed before inserting new plug-in amplifiers. With the Model 1926A or Model 1924 two-channel plug-in, no other procedures are necessary.

*3.3 Model 1925.* If the Model 1925 is ordered, a special internal jumper connection must be provided between pins 11 and 30 of the male connector, if not already installed. This jumper connects the Rate-Period channel of the counter to operate as the B channel for Time interval and frequency ratio measurements. It should be pointed out that the Rate-Period channel on these two models is somewhat limited for time interval and pulse width measurements because it provides no slope selection. Refer to the instruction manual for the basic counter for further details.

*Note:* Difficulty may be encountered in adapting some early production plug-in units to counters of later production and vice-versa. If so, check that the following terminals on receptacle J1 of the counter are jumpered together either on the counter itself or on the plug-in unit: #21 & #46; #42 & #43.

*3.4 Universal Counter:* With the Model 1926A-1 installed, the 1037M-2 counter performs all the measurements of a universal counter-timer. See specifications section of 1037M-2 manual for detailed listing of type of measurements and ranges when using the 1926A-1 plug-in.

# 4 — Operation

*4.1 Trigger Level Control.*
The "Level" control on the Rate (C) input channel enables one to select the DC voltage level which will produce consistent triggering of the counting circuitry. The trigger voltage level for the C input is adjustable between approximately +1.5 volts and −1.5 volts with reference to the attenuated input signal. In terms of the unattenuated signal applied to the input jack, the trigger level is equal to the product of the selected attenuation factor and the trigger level voltage of the attenuated signal.

TO ADJUST THE TRIGGER LEVEL, SET THE FUNCTION SWITCH TO "COUNT" AND ADJUST THE TRIGGER LEVEL CONTROL TO THE MIDPOINT OF THE COUNTING RANGE. THEN CHANGE THE FUNCTION SWITCH TO THE DESIRED MODE OF OPERATION.

This is a convenient way to select a trigger voltage level at approximately the center of the steepest slope of the input waveform and will reduce the possibility of spurious pulses from noise causing false count. The relationship between triggering level and attenuation is illustrated in Figure 5.

*4.2 Slope Controls (Model 1926A).* There is no slope control on the Rate input channel of the basic Model 1037. Both the A and B input channels have associated slope switches which are used in conjunction with the Trigger voltage controls. In the "+" position, the channel will produce a triggering pulse when the input signal rises to the selected trigger voltage level, and in the "−" position when the signal falls to the selected trigger voltage level, In the Period measurement only (not multiple Period), both slope switches are associated with the A channel and must be set to the same polarity in order to measure one complete cycle of the signal applied to this channel. In multiple Period measurements, it is not possible to measure a half cycle.

It should be noted that the trigger levels for + slope and − slope settings do not exactly coincide because of "hysteresis" in the trigger circuit. This results in an upper trigger level for a positive-going input and a lower trigger level for a negative-going input, as illustrated in Figure 5. Both trigger levels must be intersected to produce a complete triggering cycle. These levels are separated by approximately 0.3 volt peak-to-peak, which determines the minimum input voltage or sensitivity of the amplifier channel. In making time interval measurements, using both the + and − triggering slopes, hysteresis must be taken into account for accurate results, as described in paragraph 3.33.

*4.3 Channel Output (Model 1926A only).* The A and B channels have corresponding output jacks on the plug-in module panel which provide a rectangular output waveform for use as a trigger marker. By superimposing this channel output waveform and the input signal waveform on a dual trace oscilloscope, the precise trigger level of the input signal can be selected, as indicated by the intersection of the two waveforms. The trigger control can adjust either the positive slope or negative slope intersections to occur at the desired trigger level.

(Because of trigger circuit hysteresis, these two intersections are not precisely at the same trigger level.) The relationship of output marker to input waveform does not change with selection of slope.

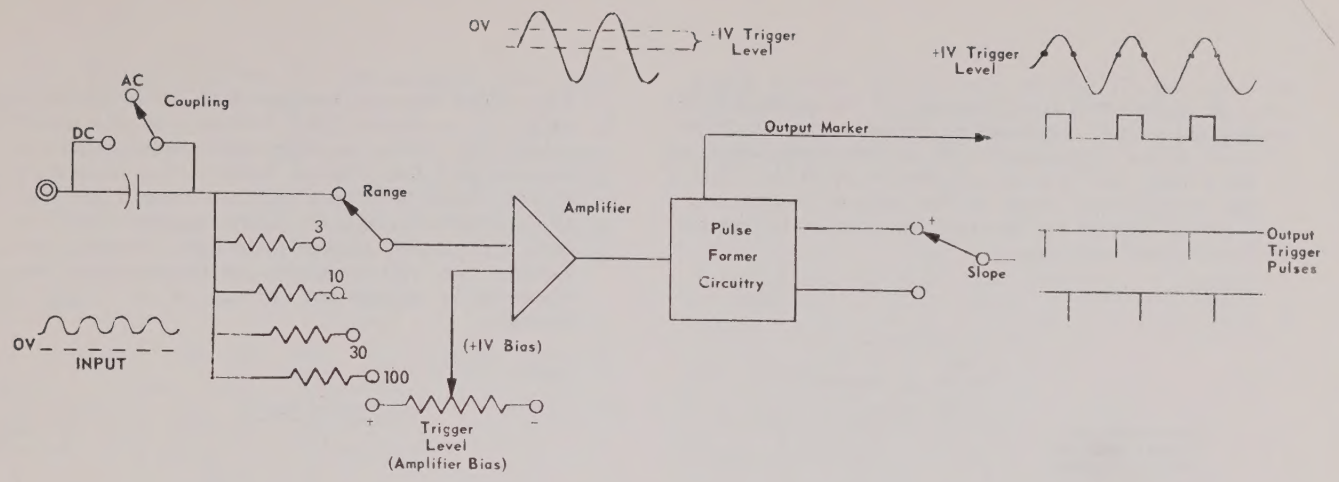


*Figure 4. Input Control Functions (Shown for Model 1926A Plug-in)*

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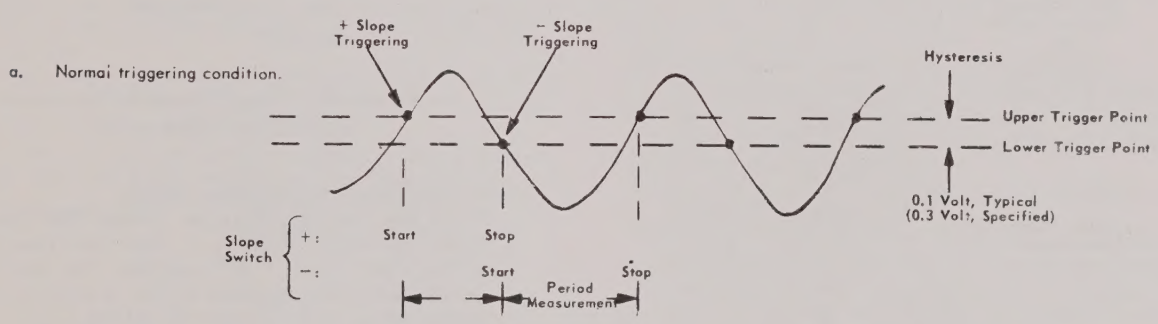
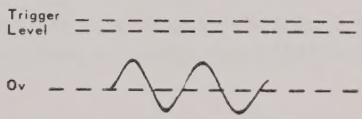
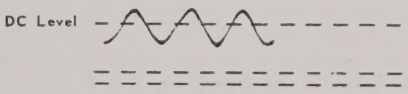


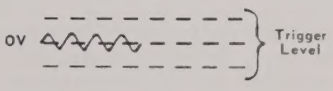

b. No triggering with AC coupling
(Trigger level is too high or too much attenuation)




c. No triggering with with DC Coupling
OK with AC Coupling
(Trigger level is too low relative to attenuation.)




d. No triggering on AC Coupling and
0 volt trigger level.
(Too much attenuation.)




e. Spurious triggering from
excessively large noise component.

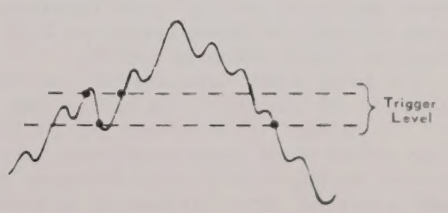



*Figure 5. Relationship Between Trigger Voltage Level & Attenuation*

If a dual trace oscilloscope is not available, the channel output waveform can be connected to the external scope trigger input. The trigger level control on the counter can then be adjusted to shift the start of the oscilloscope trace to the desired trigger level. Figure 6 depicts the oscilloscope display for the conditions mentioned above.

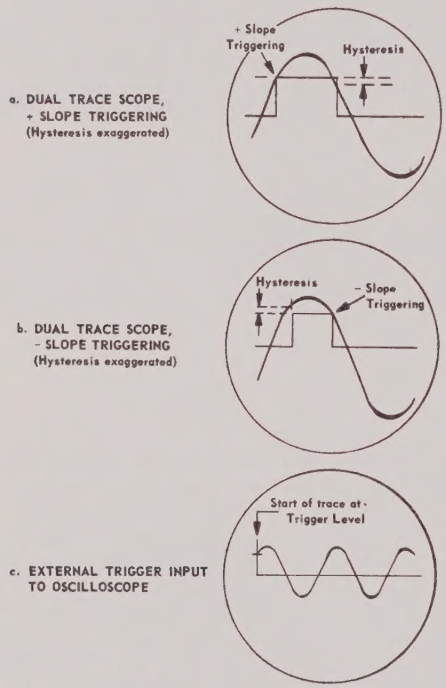

a. DUAL TRACE SCOPE, + SLOPE TRIGGERING (Hysteresis exaggerated)
+ Slope Triggering
Hysteresis
b. DUAL TRACE SCOPE, - SLOPE TRIGGERING (Hysteresis exaggerated)
Hysteresis
- Slope Triggering
c. EXTERNAL TRIGGER INPUT TO OSCILLOSCOPE
Start of trace at - Trigger Level

***Figure 6. Oscilloscope Display of Channel Output (Model 1926A only) (Refer to paragraph 3.19)***

***4.4 Separate-Combined Inputs (Model 1926A) only.*** This switch is used in the COMBINED mode only for pulse width measurements with the Time Interval mode. (Refer to "Time Interval Measurements".)

***4.5 Period and Pulse Width Measurements with Model 1926A Plug-in.*** When the Model 1926A plug-in is installed, make all period measurements with the input signal applied to the "A" input connector. Follow the same procedure as above except set both the A and B slope switches to the same polarity.

For pulse width measurements, set the "A" slope switch to the polarity of the leading edge of the pulse ("+" if rising, "–" if falling) and set the "B" input Slope switch to the opposite polarity. Adjust the trigger level to the amplitude at which the pulse width measurement is desired. Note that there is no means to compensate for the hysteresis of the triggering circuit when using the Period function for pulse width measurements, since only one trigger level control is involved. Refer to paragraph 3.32 for an alternate method of pulse width measurements.

***4.6 Time Interval Measurement (with Model 1926A only).*** In the TIME B-A function, the instrument counts the number of time base output pulses which occur during the interval between two separate input pulses. Refer to Figure 10. Two input signals of different amplitudes and d.c. levels may be applied. If the same input signal is applied to both channels, the time between two voltage levels on the waveform may be measured by appropriate settings of the Trigger level controls.

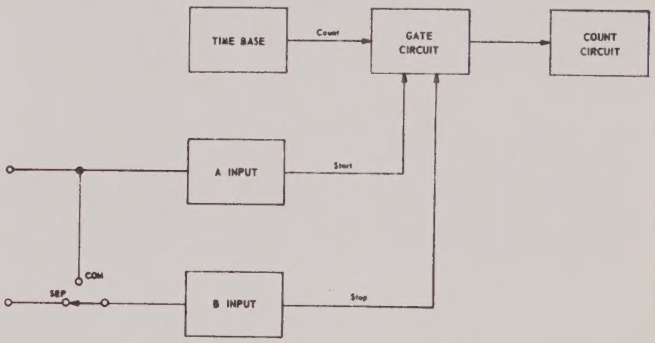



***Figure 10. Time Interval Measurement (with Model 1926A only)***

To make a Time Interval Measurement:

1. Place the Function Selector in the TIME position.
2. Apply the input which is to start the time interval to the input of the "A" amplifier. Set the SLOPE switch above the amplifier to the polarity of voltage change which is to initiate the timing.
3. Apply the input signal which is to stop the time interval to the "B" amplifier. Set the SLOPE switch above the amplifier to the polarity of voltage change which is to stop the timing. If the same input is used for both start and stop signals, apply this signal to the "A" input and place the SEParate-COMbined switch at "COM".
4. Set the Time Base Selector to a suitable frequency for the measurement being made. The indication will be in terms of seconds, milliseconds, or microseconds between the two signals.

***4.7 Pulse Width Measurements in Time Function.*** More accurate pulse width measurements can be made in the Time Interval function than in the Period function, since the start and stop trigger levels can be individually adjusted to eliminate hysteresis error. Follow the procedure for Timer Interval measurements, except:

1. Place the SEParate-COMbined switch at "combined" and apply the input signal to the "A" input connector.
2. Observe the output marker waveforms superimposed upon the input waveform.

Adjust the A trigger control so that the leading (rising) edge of the A marker waveform coincides with the desired trigger level. Adjust the B trigger level control so that the trailing (falling) edge of the B marker waveform coincides with the same trigger level. Refer to Figure 6.

*4.8 Frequency Ratio C/A Measurement (with Model 1926A only).* This function measures the ratio of two frequencies or, in other words, measures the number of events (input pulses) occuring on the C input channel during the period of a second signal on the A input channel. The circuit shown in Figure 11 is similar to the Rate function with the time base being replaced by the external signal source. The decimal indication remains in the far right position.

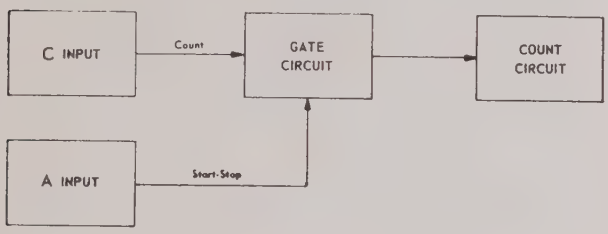



*Figure 11. Ratio Measurement (with Model 1926A only)*

To make a ratio measurement:

1. Place the Function Selector at the "Ratio C/A" position.
2. Apply the higher frequency input to the C amplifier input and the lower frequency signal to the A amplifier input.
3. If the ratio of two cyclical signals is being measured, set both Slope switches to the same polarity.
4. The indication = $\frac{\text{frequency of C input}}{\text{frequency of A input}}$

*4.9 Multiple Ratio Measurement.* In the multiple ratio functions, the measurement is extended for a duration of 10 or 100 (Model 1037M-2 only) cycles of the A input signal. As with the multiple period measurements, this method produces greater accuracy or an average reading. Follow the procedure for Ratio measurements except change the Function selector to the desired multiple period position. The decimal indication is automatically shifted, yielding a direct reading.

*4.10 Gate Function $C/_{B-A}$ (with Model 1926A only).* (Not available with Model 1037M-2)

In the Gate function the instrument counts the number of complete cycles of an input signal which occur during the interval between two pulses from separate signal sources. In this case (Figure 12) the start and stop pulses for the gating circuit are derived from the A and B input channels. The input "C" to be counted is applied to the Rate-Period channel.

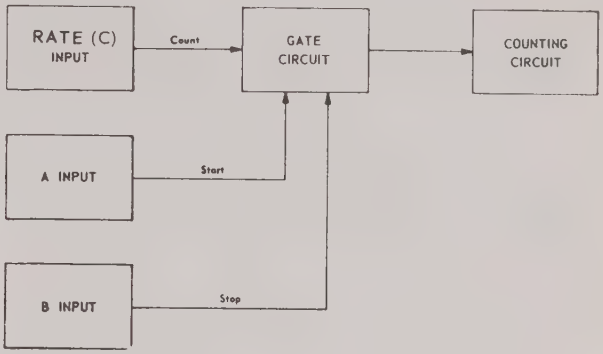



*Figure 12. Gate Function (with Model 1926A only)*

To make a measurement in the Gate function:

1. Place the Function selector in the Gate position.
2. Apply the highest frequency signal (the events to be counted or the external time reference) to the Rate-Period amplifier.
3. Apply the signal which is to start the measurement to the A amplifier.
4. Apply the signal which is to stop the measurement period to the B amplifier. Set the Slope switches to correspond to the polarity of each voltage change which is to produce the start and stop signals "+" if rising voltage, "–" if falling).

*4.11 Dual Measurement Operation (Model 1924 only).* In the dual measurement mode of operation, rate or period measurements can be made on channels A and B either individually or alternately. Set the selector switch on the counter to the desired type of measurement. Set the Model 1924 selector to ALTernate. The counter will measure the "A" input signal and then, after resetting, will measure the "B" channel signal.

To measure only one input signal, place the selector to the A or B position. The "count" mode of measurement can also be made in this manner.

# 5 — Circuit Description

*5.1 Input Attenuator.* The input attenuator includes five divider networks of either 10 megohms, or 1 megohm impedance, by-passed by 50 pf. Adjustable trimmer capacitors are provided for frequency compensation. These are factory-adjusted to obtain proper compensation with a squarewave input. The input circuit of the amplifier has limiters which permit signals up to 500 volts peak-to-peak to be applied to the input terminals. The Trigger Level potentiometer adds a DC bias opposite in polarity to the sign indicated on the panel, to the amplifier input. When the DC level of the input signal is equal to the indicated trigger voltage, a triggering pulse is produced at the amplifier output.

*5.2 D. C. Amplifier Section (Refer to Dwg. 11111)*

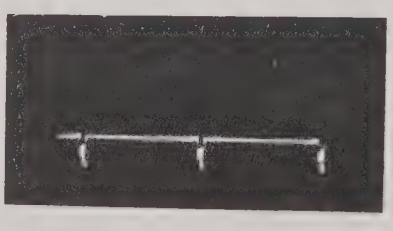
A "Nuvistor" tube is used in the input stage because of its high frequency response and input impedance characteristics. Limiting diodes CR101 and CR102 protect the tube from overload by limiting the grid to ±6 volts. The input stage, V101, functions as a cathode follower having very high input impedance and low output impedance for operation into the following transistor circuits. Q101 is an emmiter-follower driving the amplifier stage Q102. Potentiometer R108 is the trigger zero adjust potentiometer. It is adjusted so that an output trigger pulse is produced when the input signal passes through zero volts and the TRIGGER LEVEL control is set at "0".

The amplified output of Q102 which may be a clipped waveform when a sinewave input is applied, drives the following Schmitt Trigger circuit, Q107 and Q108 thru emitter followers Q103 and Q104 and the limiting network between them. This circuit has two stable conditions and is triggered from one state to the other when the signal voltage applied to it passes through a threshold level of approximately 0.65 volts in the positive direction or 0.25 volts in the negative direction, as measured at the collector of Q102.

The 0.40 volt difference between the positive and negative threshold levels, referred to as the hysteresis of the Schmitt trigger, is the minimum signal amplitude required to operate the trigger and is equivalent to much less than the rated input sensitivity for channels A and B (0.1 volt r.m.s. at the input terminals. The output of the Schmitt Trigger is a squarewave, regardless of the input waveform applied.

The Schmidt Trigger drives two pulse transformers, T101 and T102. Q105 in the emitter circuit of the Schmidt Trigger provides a constant current source which compensates for the loading effect of the output transformers to help preserve the output squarewave. Each output pulse transformer produces a negative differential waveform, corresponding to either a positive-slope or a negative-slope on the primary, depending on which side of the center-tapped secondary winding is grounded by the SLOPE switch. These negative pulses are fed to the bases of Q108 ($A^1$ output) and Q109 ($A'$ output) which amplify, invert and lengthen them. This is illustrated in Figure 1. The two output pulses from the "A" channel permit the start and stop channels to be operated by inputs of different slopes. From the Model 1926 block diagram (Dwg. 11107), it can be seen that the $A^1$ output polarity is selected by the B channel slope switch. The B amplifier channel is identical to the A channel, except that it has only one output transformer.

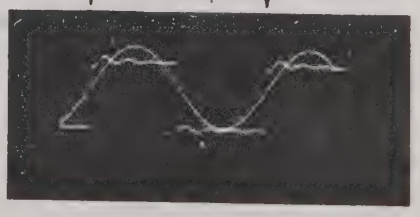
*5.3 Gate Amplifier Channel.* Q301 and Q302 function as a Schmitt Trigger. The following output circuit is identical to that in the B amplifier channel.



Triggering pulses at channel output (pin M).

200KC input. 10V/cm vertical

1μ second/cm horizontal




Dual-trace oscilloscope pattern showing the squarewave marker output at the scope output jack superimposed upon a sinewave input signal. The positive slope of the squarewave intercepts the selected trigger level on the input signal for both positive and negative positions of the Slope switch.

(Zero trigger level is illustrated.)

10KC input, 5V/cm vertical (both traces)

***Figure 1. Amplifier Waveshapes***

# 6 — Maintenance and Calibration

### 6.1 *Input Amplifier (Sensitivity Adjustments)*

a. Attach the scope probe to test point 11, which is located at the top of Illustration Index number 17 (Part R103).

b. Set range switch to position 1; AC/DC switch to AC position.

c. Apply a 100 mV, 1 Mc square wave from test oscillator to the C input.

d. Adjust C3 so that waveform at test point 11 has a 10% overshoot (See Figure 6.1)

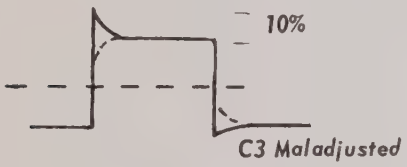



*Figure 6.1*

e. Set range switch to position 10; increase amplitude of test oscillator to 1 V. Adjust C1 in a similar way.

f. Set range switch to position 100; increase amplitude of test oscillator to 10V. Adjust C3 in similar way.

### 6.2 *Period Input Amplifiers (with Model 1926A)*

a. Insert a Model 1926A into the counter and apply power. (Note: Always turn power off while changing plug-in units). Place the scope probe at test point 12 as shown in Figure 11.2.

b. Select "AC" coupling and an attenuation of "1". Apply a 1 Mc square wave signal with an amplitude of 1 V to the "A" input jack.

c. Adjust C4 of Figure 11.2 to obtain fastest rise time (best square wave form).

d. Switch attenuator to "3" and adjust C5 for best square wave.

e. Change scope probe to test point 13 and apply the 1 Mc square wave signal to the "B" input jack.

f. Select "AC" coupling and an attenuation of "1" and adjust C6 for best square wave.

g. Switch attenuator to "3" and adjust C7 for best square wave.

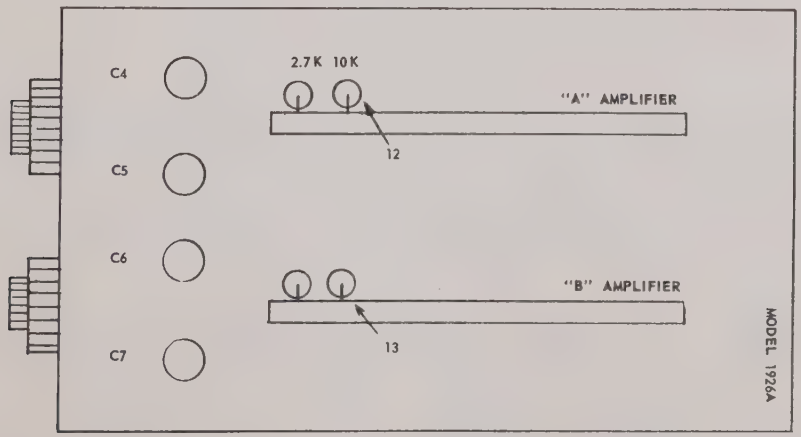
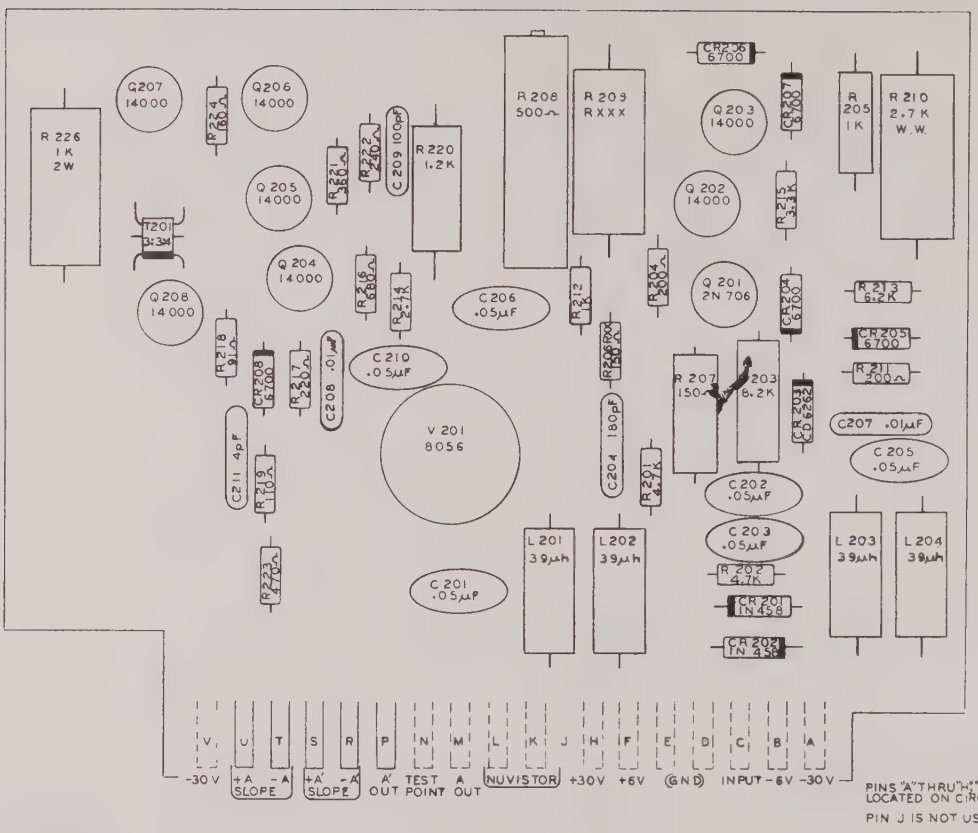


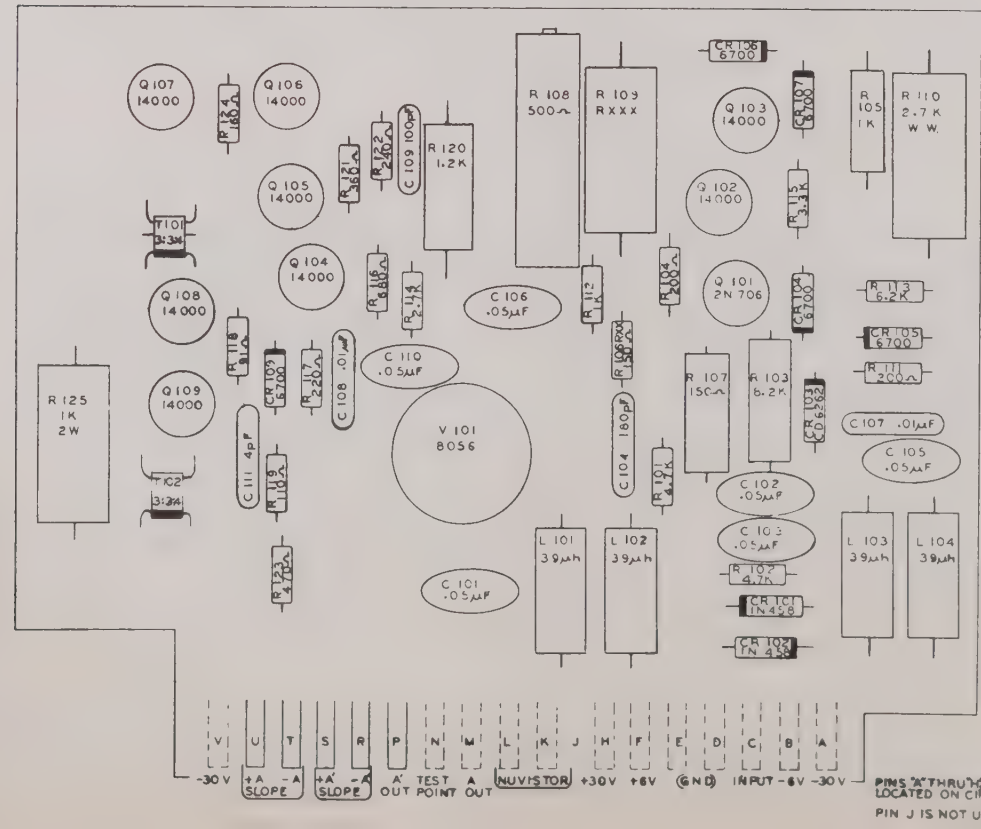

*Figure 6.2 Testpoints and Adjustments for Period Input Amplifier (Model 1926A)*

"B" Amplifier




PINS "A" THRU "H" "K" THRU "N" "V" ARE LOCATED ON CIRCUIT SIDE OF P.C. BOARD.
PIN J IS NOT USED.

"A" Amplifier



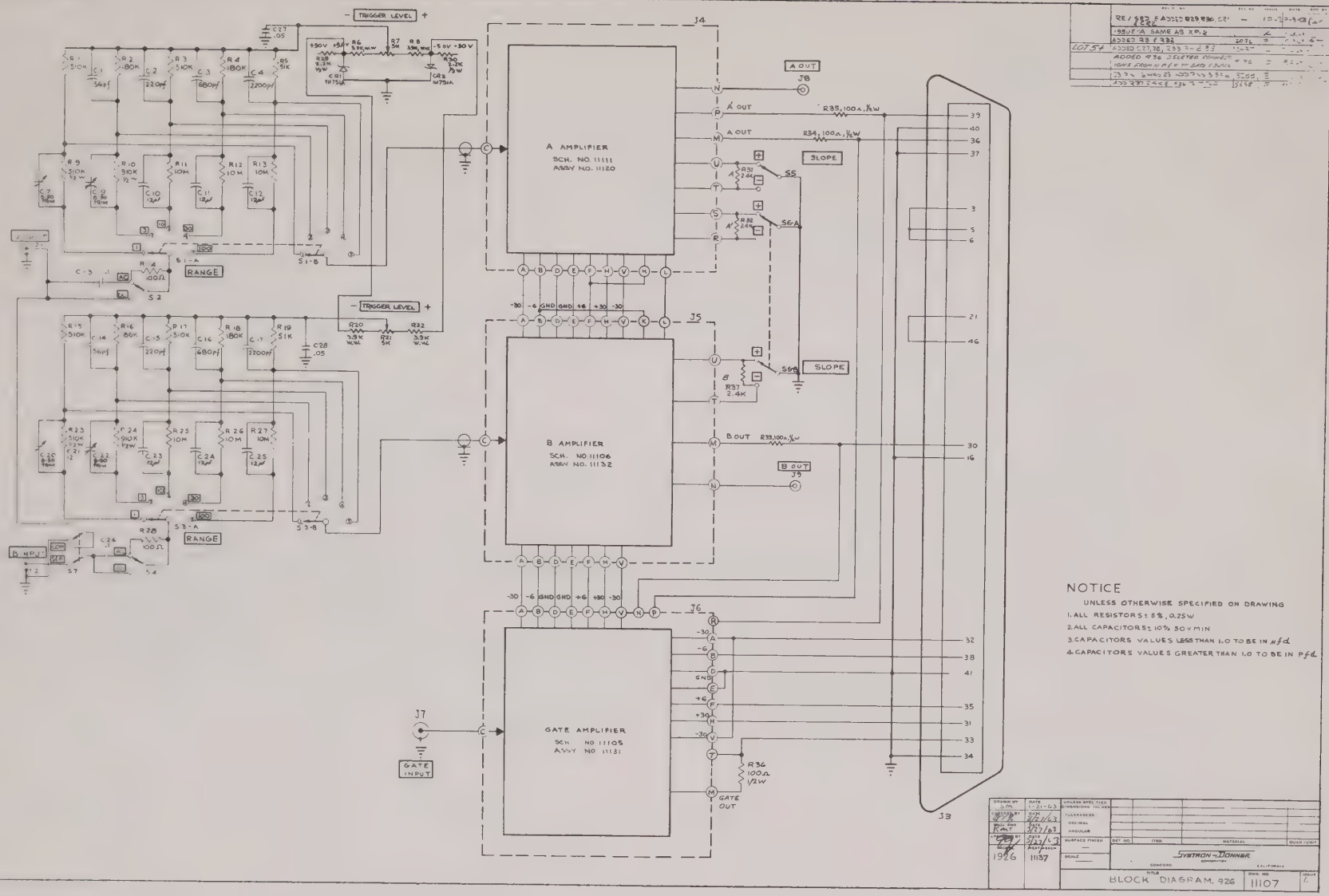

PINS "A" THRU "H" "K" THRU "N" "V" ARE LOCATED ON CIRCUIT SIDE OF P.C. BOARD.
PIN J IS NOT USED.

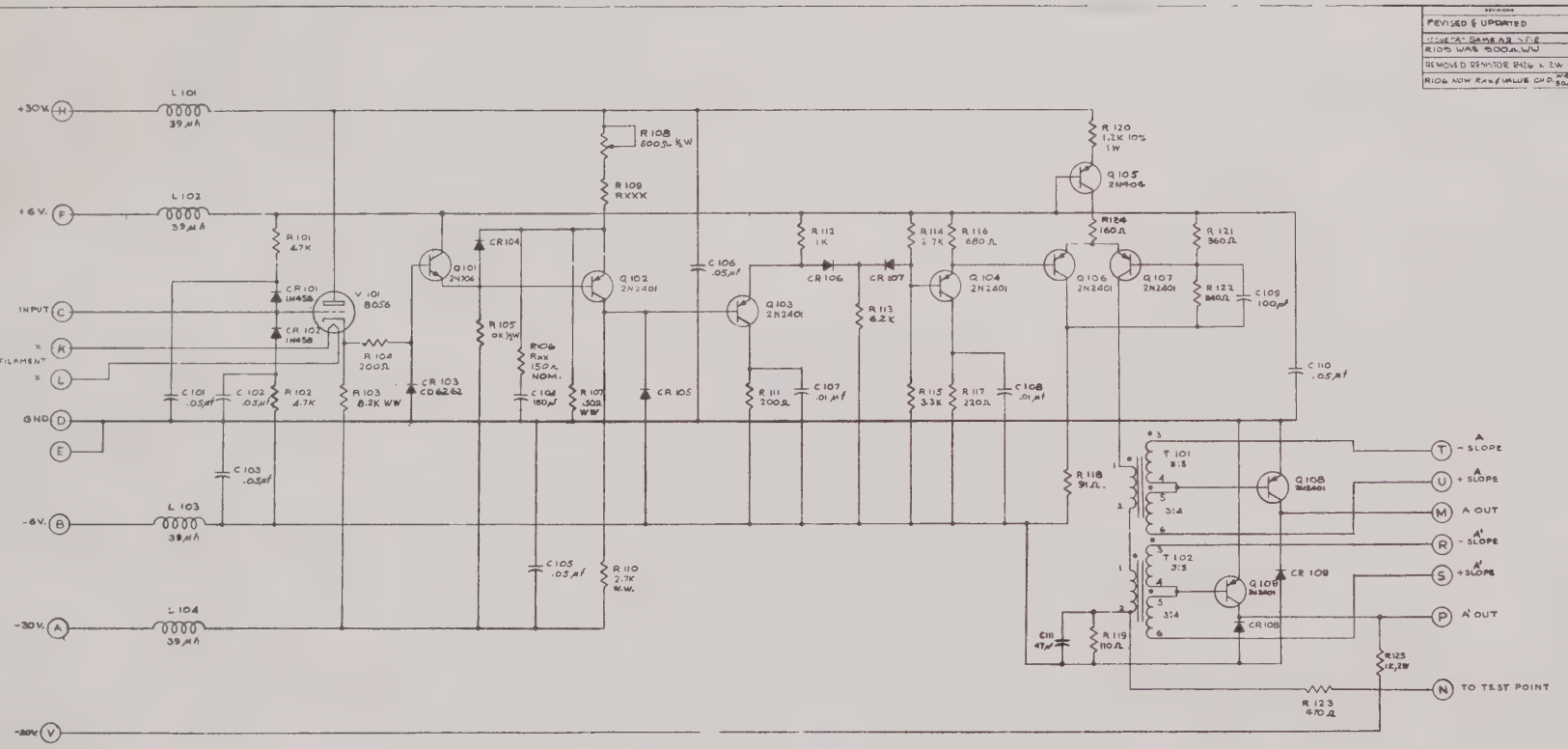
## PARTS LIST - 1926A PLUG-IN

| S-D Part No. | Description | REFERENCE A Amplifier | B Amplifier |
|---|---|---|---|
| C-0533 | Capacitor, 47 pfd D.S.M. | C111 | C211 |
| C-0536 | Capacitor, 100 pfd D.S.M. | C109 | C209 |
| C-0643 | Capacitor, 180 pfd D.S.M. | C104 | C204 |
| C-0233 | Capacitor, .01 u fd Disc | C107, 108 | C207, 208 |
| C-0708 | Capacitor, .05 u fd Disc | C101, 102, 103, 105 106, 107 | C201, 202, 203, 205, 206, 210 |
| CR-0116 | Diode, 1N458 | CR101, 102 | CR201, 202 |
| CR-0150 | Diode, CD 6262 | CR103 | CR203 |
| 6700 | Diode, S.D. 6700 | CR104, 105, 106, 107 108, 109 | CR204, 205, 206, 207 208 |
| L-0008 | Choke, 39 u hy | L101, 102, 103, 104 | L201, 202, 203, 204 |
| Q-0055 | Transistor, 2N404 | Q105 | Q205 |
| Q-0130 | Transistor, 2N706 | Q101 | Q201 |
| 19-14000 | Transistor, 19-14000 | Q102, 103, 104, 106 107, 108, 109 | Q202, 203, 204, 206, 207, 208 |
| R-1317 | Trimpot, 500Ω, 1/2w, wire wound | R108 | R208 |
| R-1213 | Resistor, 91Ω, 1/4w | R118 | R218 |
| R-1215 | Resistor, 110Ω, 1/4w | R119 | R219 |
| R-5021 | Resistor, 150Ω, (nom.) 1/4w | R106 | R207 |
| R-0983 | Resistor, 150Ω, (nom.) 1/4w | R106 | R206 |
| R-1572 | Resistor, 160Ω, 1/4w | R124 | R224 |
| R-0736 | Resistor, 200Ω, 1/4w | R104, 111 | R204, 211 |
| R-0760 | Resistor, 220Ω, 1/4w | R117 | R217 |
| R-0835 | Resistor, 240Ω, 1/4w | R122 | R222 |
| R-1571 | Resistor, 360Ω, 1/4w | R121 | R221 |
| R-1044 | Resistor, 470Ω, 1/4w | R123 | R223 |
| R-0765 | Resistor, 1K, 1/4w | R112 | R212 |
| R-1573 | Resistor, 1K, 2w | R125 | R226 |
| R-0492 | Resistor, 1.2K, 1w | R120 | R220 |
| R-1591 | Resistor, 1.2K (nom.) 3w W.W. | R109 | R209 |
| R-0937 | Resistor, 2.7K, 1/4w | R114 | R214 |
| R-1579 | Resistor, W.W. | R110 | R210 |
| R-0742 | Resistor, 3.3K, 1/4w | R115 | R215 |
| R-0892 | Resistor, 4.7K, 1/4w | R101, 102 | R201, 202 |
| R-0965 | Resistor, 6.2K, 1/4w | R113 | R213 |
| R-1574 | Resistor, 8.2K, W.W. | R103 | R203 |
| R-0292 | Resistor, 10K, 1/2w | R105 | R205 |
| 11348 | Transformer | T101, 102 | T201 |
| V-0106 | Nuvistor | V101 | V201 |
| X-0106 | Socket, Nuvistor | -- | -- |
| 11120 | Amplifier "A" Assy | Schem 11111 | Schem 11106 |
| 11140 | P.C. Bd for Amp. "A" & "B" | Artwork 11141 | Artwork 11141 |

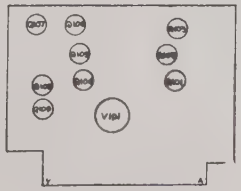
## PLUG-IN AMPLIFIER ASSEMBLY

| S-D Part No. | Description | Reference |
|---|---|---|
| J-0261 | Connector | Amphenol Blue Ribbon 57-10500 |
| S-0110 | Switch, DDPT | S2, S4, S5, S6, S7 |
| J-0138 | Bannana-Jack-White | |
| 11637 | Knob-Black & Red | RB 999-700 |
| J-0260 | Connector | BNC |
| E-0137 | Ground Lub | BNC Type |
| J-0265 | Connector | Viking VH 18/1AB5 |
| H-0980 | Screw - Phillips | 4-40x1/4 |
| H-0981 | Screw-Hex HD-Self Tap. | 4-40x1/4 |
| H-1065 | Screw - Phillips | 4-40x1/2 |
| H-0734 | Washer, Cad Pl. Steel | #4 |
| H-0441 | Hex Nut | 4-40 |
| H-0951 | Terminal Strip | Cinch 1540 |
| H-0845 | Ground Lug | |
| H-0453 | #4 Tinnerman | |
| H-0954 | Drive Rivet - 1/8 x 3/16 | Southco #38-504-03 |
| H-0404 | Rivet - 1/8 x 1/8 | |
| H-0758 | Washer - #4 Flat | |
| C-0382 | Capacitor .1 uf | C13, C26 |
| R-0966 | Resistor, 100Ω, 1/4w 5% | R14, R28 |
| R-0259 | Resistor, 2.2K 1/2w | R29, R30 |
| R-1577 | Resistor, 3.9K, WW | R6, R8, R20, R22 |
| C-0708 | Capacitor .05 uF | C5, C6, C18, C19, C27, C28 |
| CR-0095 | Diode, 1N751A | CR1, CR2 |
| R-1045 | Resistor, 2.4K, 5% | R31, R32 |
| R-0466 | Resistor, 100Ω, 1/2w 5% | R33, R34, R35 |
| H-0745 | 4-40x3/8 FHMS | Pull - Front Panel |
| | Coax | |
| | Insulated Shield | |
| | Wire #22 GA - Stranded | |
| | Bussing | |
| | Wire #18 GA - Stranded | |
| 1-11101 | Support Cover | |
| 1-15583 | Pull - Front Panel | |
| 1-13772 | Front Panel | |
| 2-11126 | Welded Assembly Plug-In Amp | |
| 2-11120 | Assembly PC Bd "A" Amp | |
| 2-11132 | Assembly PC Bd "B" Amp. | |
| 2-11134 | Assembly A&B Range Sw. | |
| 1-11124 | Rear Plate | |


TRIGGER LEVEL
A AMPLIFIER
SCH. NO. 11111
ASSY NO. 11120
B AMPLIFIER
SCH. NO 11106
ASSY NO. 11132
GATE AMPLIFIER
SCH NO 11105
ASSY NO 11131
A OUT
B OUT
SLOPE
RANGE
GATE INPUT
GATE OUT
J3
J4
J5
J6
J7
J8
J9
-30 -6 GND GND +6 +30 -30
NOTICE
UNLESS OTHERWISE SPECIFIED ON DRAWING
1. ALL RESISTORS ± 5%, 0.25W
2. ALL CAPACITORS ± 10% 30V MIN
3. CAPACITORS VALUES LESS THAN 1.0 TO BE IN μfd
4. CAPACITORS VALUES GREATER THAN 1.0 TO BE IN pfd
SYNTRON-DONNER
CONCORD CALIFORNIA
BLOCK DIAGRAM, 926
DWG NO 11107
1926
11137




| REVISIONS | ECO NO | ISSUE | DATE | APP BY |
|---|---|---|---|---|
| REVISED & UPDATED | – | XP-2 | 3-6-63 | |
| ISSUE "A" SAME AS XP-2 | – | A | 3/26/63 | |
| R105 WAS 500Ω WW | 2061 | B | 4-24-63 | |
| REMOVED RESISTOR R126 & ZW | 2062 | C | 8-5-63 | |
| R106 NOW RANGE VALUE CHD TO 50Ω | 2091 | D | 9-11-63 | |

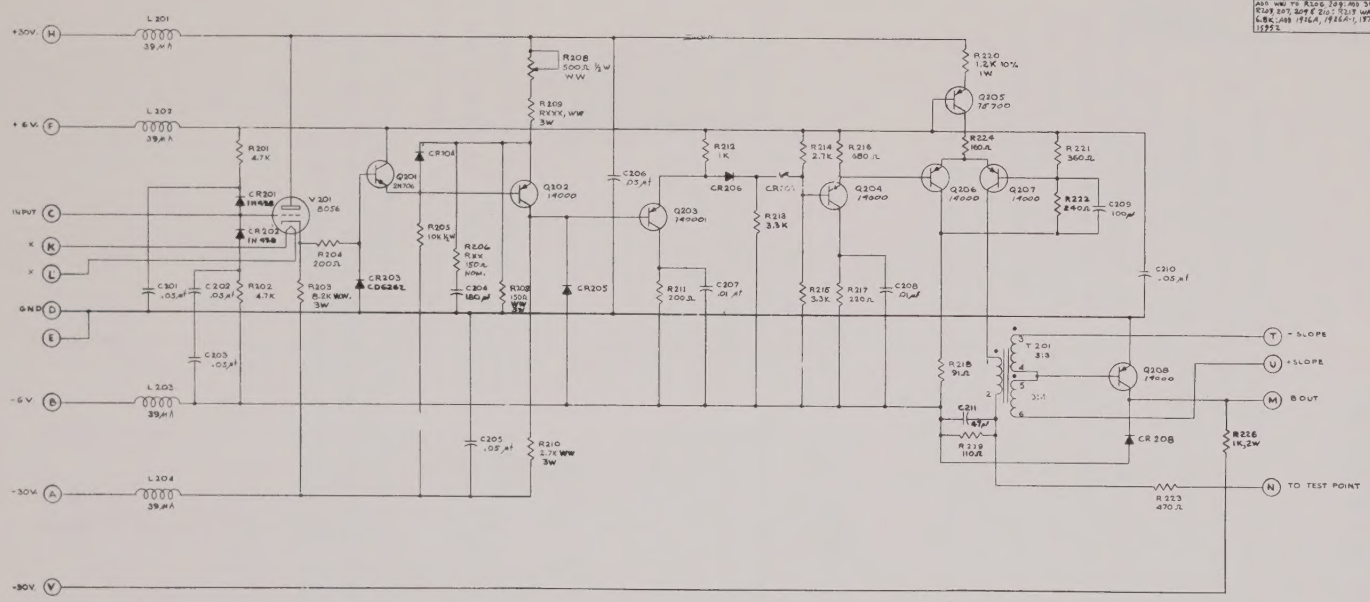


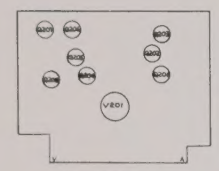

NOTES

UNLESS OTHERWISE SPECIFIED ON DRAWING

1. ALL RESISTORS ±5%, 0.25 W.
2. ALL CAPACITORS ±10% 50V. MIN.
3. CAPACITOR VALUES LESS THAN 1.0 TO BE IN μfd
4. CAPACITOR VALUES GREATER THAN 1.0 TO BE IN pfd
5. ALL DIODES PER SYSTRON DONNER CORP SPEC. NO G-6700
6. R106 IS SELECTED VALUE

| | | | |
|---|---|---|---|
| DRAWN BY SM | DATE 1-18-63 | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE | |
| CHECKED BY | DATE 3/12/63 | TOLERANCES: DECIMAL | |
| APPROVED BY | DATE 3/21/63 | ANGULAR | |
| ENGR APPROVED BY | DATE 3/26/63 | SURFACE FINISH | MAT'L |
| | | SCALE | |
| 1926 | 111120 | "A" AMPLIFIER SCHEMATIC | |
| 1925 | | | |




'B' AMPLIFIER

NOTES:

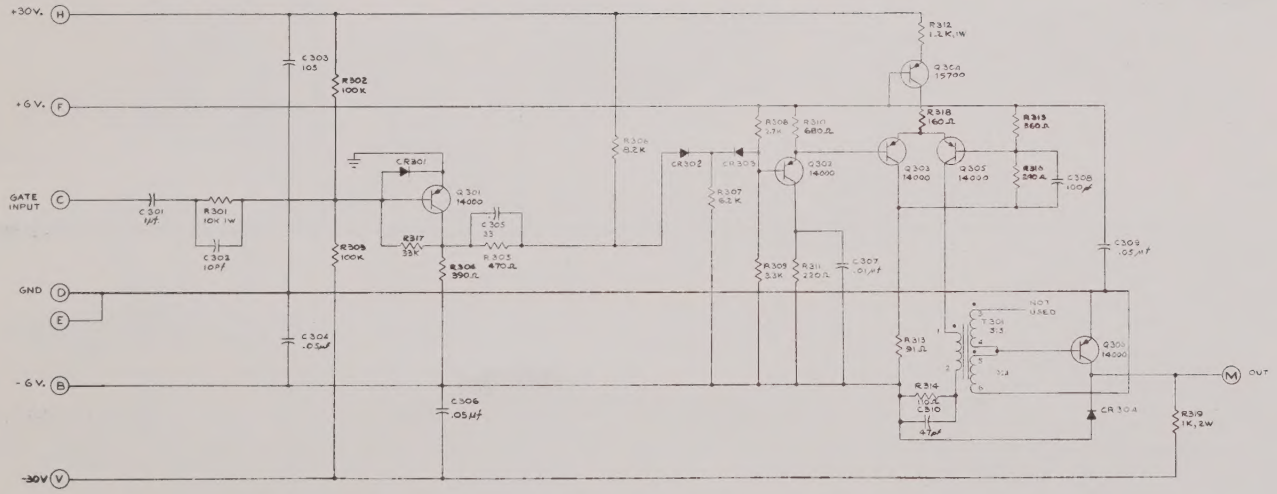
UNLESS OTHERWISE SPECIFIED ON DRAWING

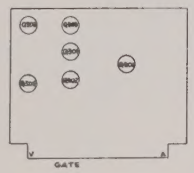
1. ALL RESISTORS ± 5 %, 0.25 W
2. ALL CAPACITORS ± 10 % 50V MIN
3. CAPACITORS VALUES LESSTHEN 1.0 TO BE IN μfd.
4. CAPACITORS VALUES GREATER THEN 1.0 TO BE IN pfd.
5. ALL DIODES PER SYSTRON DONNER CORP. NO. 6-6700
6. R209 IS SELECTED VALUE

| REVISIONS | ENG. NO. | ISSUE | DATE | APP'D |
|---|---|---|---|---|
| REVISED & UPDATED | - | IOP-2 | 3-5-63 | |
| ISSUE "A" SAME AS XP-2 | - | A | | |
| R209 WAS 900Ω, WW | 2041 | B | 7-24-63 | |
| CORRECTION R XXX (OHMS VALUE NOT SHOWN) | 2091 | C | 9-9-63 | |
| ADD WW TO R208, 209, 213 3W TO R209 207, 209 & 210 R217 WAS 6.8K, 1000 1926A, 1926A-1, 1977-1 & 15952 | 3149 | D | 3/4/65 | |

| | | | | |
|---|---|---|---|---|
| DRAWN BY: SM | DATE: 1-10-63 | UNLESS SPECIFIED DIMENSIONS INCH | | |
| CHECKED BY: [illegible] | DATE: 3/12/63 | TOLERANCES: DECIMAL | | |
| ENG. APP. [illegible] | DATE: 3/5/63 | ANGULAR | | |
| APPROVED BY: [illegible] | DATE: 3/20/63 | SURFACE FINISH | DWT. NO. | ITEM |
| | | | MATERIAL | FINISH, PAINT |
| 1926 1926A 1926A-1 | 11132 15771 15952 | SCALE | CONCORD, CALIFORNIA | |
| | | TITLE 'B' AMPLIFIER SCHEMATIC | | SERIAL NO. 11106 |
| | | | | ISSUE D |

| REVISIONS | ECO NO. | DRWG | DATE | APP'D |
|---|---|---|---|---|
| REVISED & UPDATED | - | KP 2 | 5-3-68 | PMT |
| INPUT "A" SAME AS ICM 2 | - | A | 7/16/68 | |
| ADD 330Ω, 1/4W RESISTOR R316 MAKE 47Ω 1/2W RESISTOR R317 | 9746 | B | 9/4/73 | |




NOTES:

UNLESS OTHERWISE SPECIFIED ON DRAWING

1. ALL RESISTORS ±5%, 0.25 W
2. ALL CAPACITORS ±10% 50V MIN
3. CAPACITORS VALUES LESS THAN 1.0 TO BE IN μfd
4. CAPACITORS VALUES GREATER THAN 1.0 TO BE IN P/cl
5. ALL DIODES PER SYSTRON DONNER CORP. № 6-6700

| | | | |
|---|---|---|---|
| DRAWN BY: S.M. | DATE: 1-18-63 | UNLESS SPECIFIED DIMENSIONS: INCHES | |
| CHK'D BY: PMT | DATE: 2/27/63 | TOLERANCES: DECIMAL | |
| APPROVED BY: [illegible] | DATE: 3/21/63 | ANGULAR | |
| ENGR: [illegible] | DATE: 3/29/63 | SURFACE FINISH | |
| 1926 | 11131 | SCALE | |

CONCORD CALIFORNIA

TITLE: GATE AMPLIFIER SCHEMATIC

DWG. NO. 11105 REV B

# WARRANTY

Systron-Donner instruments are warranted during a period of one year from date of shipment to original purchaser to be free from defects in material and workmanship. This warranty does not apply to vacuum tubes, except as they are warranted by tube manufacturers. The liability of Seller under this warranty is limited to replacing or repairing any instrument or component thereof which is returned by Buyer at his expense during such period and which has not been subjected to misuse, neglect, improper installations, repair, alteration, or accident. Seller shall have the right of final determination as to the existence and cause of a defect. In no event shall Seller be liable for collateral or consequential damages. This warranty is in lieu of any other warranty, express, implied or statutory, and no agreement extending or modifying it will be binding upon Seller unless in writing and signed by a duly authorized officer.

## RECEIVING INSPECTION

Every Systron Donner instrument is carefully inspected and is in perfect working order at the time of shipment. Each instrument should be checked as soon as received. If the unit is damaged in any way or fails to operate, a claim should immediately be filed with the transportation company.

## REPAIRS

Whenever a Systron-Donner instrument requires service, the nearest Systron-Donner representative should be contacted; all representatives will provide immediate service or arrange factory returns when necessary.

Please specify both model and serial number in all correspondence concerning Systron-Donner instruments. Address all inquiries on operation or applications to your nearest sales representative or Sales Manager, Instruments, Systron-Donner Corporation, 888 Galindo Street, Concord, California.

MP MASTER
MA34154